CLAIMS

1. A supported metallic compound comprising a support based on aluminium oxide onto which a tungsten hydride is grafted.

2. A compound according to claim 1, characterised in that the support is selected from among supports with a homogenous composition based on aluminium oxide and from among heterogeneous supports based on aluminium oxide comprising aluminium oxide essentially at the surface of said supports.

3. A compound according to claim 1 or claim 2, characterised in that the support has a specific surface area (BET) selected in a range of from 0.1 to 1000 m^2/g, preferably from 0.5 to 800 m^2/g.

4. A compound according to any one of claims 1 to 3, characterised in that the support comprises aluminium oxide, mixed aluminium oxides or modified aluminium oxides, in particular modified by one or more elements from groups 15 to 17 of the periodic table of the elements.

5. A compound according to claim 4, characterised in that the support comprises aluminium oxide selected from among porous aluminas, non-porous aluminas and mesoporous aluminas.

6. A compound according to claim 5, characterised in that the porous alumina is selected from among γ-alumina, η-alumina, δ-alumina, θ-alumina, κ-alumina, ρ-alumina and χ-alumina, preferably from among γ-alumina and η-alumina.

7. A compound according to claim 6, characterised in that the porous alumina has a specific surface area (BET) in a range of from 100 to 1000 m^2/g, preferably from 300 to 1000 m^2/g, in particular from 300 to 800 m^2/g.

8. A compound according to claim 5, characterised in that the non-porous alumina is α-alumina.

9. A compound according to claim 8, characterised in that the non-porous alumina has a specific surface area (BET) in a range of from 0.1 to 300 m^2/g, preferably from 0.5 to 300 m^2/g, in particular from 0.5 to 250 m^2/g.

10. A compound according to claim 6 or claim 7, characterised in that the porous alumina comprises a mixture of one or more crystalline forms of porous aluminas with α-alumina, in particular in a proportion by weight of from 20 to 80%.

11. A compound according to claim 4, characterised in that the mixed aluminium oxides are selected from among aluminium oxides combined with at least one other oxide in a proportion by weight of preferably from 2 to less than 80%, in particular from 2 to less than 50%, in particular from 2 to less than 40%.

12. A compound according to claim 11, characterised in that the other oxide(s) are oxides of the elements, M,

selected from among the metals of groups 1 to 13 and the elements of group 14, with the exception of carbon, of the periodic table of the elements.

13. A compound according to claim 11, characterised in that the other oxide(s) are selected from among oxides of alkali metals, of alkaline-earth metals, of transition metals and of the elements of groups 13 and 14, with the exception of carbon, of the periodic table of the elements.

14. A compound according to claim 4, characterised in that the modified aluminium oxides comprise one or more of the elements of groups 16 or 17 of the periodic table of the elements, and are preferably selected from among superacids of alumina and sulfated, sulfided, fluorinated and chlorinated aluminium oxides.

15. A compound according to any one of claims 1 to 14, characterised in that it assumes the form of particles having an average size of from 10 nm to 5 mm, preferably from 20 nm to 4 mm.

16. A compound according to any one of claims 1 to 15, characterised in that the oxidation state of the tungsten has a value selected in a range of from 2 to 6, preferably from 4 to 6.

17. A compound according to any one of claims 1 to 16, characterised in that the tungsten atom is attached to one or more hydrogen atoms and optionally to one or more hydrocarbon residues, R.

18. A compound according to claim 17, characterised in that the hydrocarbon residues R are identical or

different, saturated or unsaturated hydrocarbon residues, comprising in particular from 1 to 20, in particular from 1 to 10 carbon atoms and optionally comprising silicon.

19. A compound according to any one of claims 1 to 18, characterised in that the tungsten atom is complexed by one or more hydrocarbon ligands, in particular aromatic ligands or carbonyl ligands.

20. A compound according to any one of claims 1 to 19, characterised in that, under infrared spectroscopy, it exhibits at least one of the two absorption bands at 1903 and 1804 cm^{-1}.

21. A compound according to any one of claims 1 to 20, characterised in that, when examined by proton nuclear magnetic resonance (solid ^{1}H-NMR) at 500 MHz, it exhibits a tungsten hydride chemical shift value (δ_{W-H}) equal to 10.6 ppm.

22. A method for production of the compound according to any one of claims 1 to 21, characterised in that it comprises (1) a dispersion and grafting step of an organometallic tungsten precursor, Pr, onto a support based on aluminium oxide, in which precursor the tungsten is in particular attached or complexed to at least one hydrocarbon ligand, so as to form a hydrocarbon compound or complex of tungsten grafted onto said support, then (2) a hydrogenolysis step of the grafted hydrocarbon compound or complex of tungsten, arising from the preceding step, so as to form a tungsten hydride grafted onto said support.

23. A method according to claim 22, characterised in that the support based on aluminium oxide is subjected to a prior calcination and/or dehydroxylation step.

24. A method according to claim 22 or claim 23, characterised in that the dispersion and grafting step is performed by sublimation, by impregnation with the assistance of a solvent, or by dry mixing.

25. A method according to any one of claims 22 to 24, characterised in that the hydrogenolysis step is performed by contacting the grafted hydrocarbon compound or complex of tungsten with hydrogen or a reducing agent.

26. Use of the compound according to any one of claims 1 to 21 in a method making use of hydrocarbon cleavage and recombination reactions.

27. Use of the compound according to any one of claims 1 to 21 as a hydrocarbon, in particular alkane, metathesis reaction catalyst.

28. Use of the compound according to any one of claims 1 to 21 in a method for manufacturing hydrocarbon(s) having a modified carbon skeleton by the reaction of at least one aliphatic hydrocarbon with itself, or with at least one other aliphatic hydrocarbon, or with at least one aromatic or cyclanic hydrocarbon substituted by at least one alkyl residue.

29. Use according to claim 28, characterised in that the aliphatic hydrocarbon is selected from among linear aliphatic hydrocarbons, in particular from C_2 to C_{30}, and branched aliphatic hydrocarbons, in particular

from C_4 to C_{30}, the aromatic hydrocarbon substituted by at least one alkyl residue is selected from among substituted aromatic hydrocarbons from C_7 to C_{30} with at least one linear or branched alkyl residue, in particular from C_1 to C_{24}, and the cyclanic hydrocarbon substituted by at least one alkyl residue is selected from among substituted cyclanic hydrocarbons from C_4 to C_{30} with at least one linear or branched alkyl residue, in particular from C_1 to C_{27}.

30. Use of the compound according to any one of claims 1 to 21 in a method for manufacturing hydrocarbon(s) by reaction of methane with at least one other aliphatic hydrocarbon, or with at least one aromatic or cyclanic hydrocarbon substituted by at least one alkyl residue.

31. Use of the compound according to any one of claims 1 to 21 in a method for manufacturing alkane(s), in particular ethane, by reaction of methane with itself.

32. Use of the compound according to any one of claims 1 to 21 in a method for manufacturing hydrocarbon(s) by a crossed metathesis reaction between at least one starting hydrocarbon and said compound.

33. Use of the compound according to any one of claims 1 to 21 in a method for manufacturing hydrocarbon(s) or hydrocarbon oligomer(s) or polymer(s) with a modified carbon skeleton by reaction of a starting hydrocarbon polymer with hydrogen.